

CUEMUS, A NEW GENUS OF TENEBRIONIDAE (COLEOPTERA) FROM THE
NORTHERN QUEENSLAND WET TROPICS

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Bouchard, P. 2000 12 31: *Cuemus*, a new genus of Tenebrionidae (Coleoptera) from the northern Queensland Wet Tropics. *Memoirs of the Queensland Museum* 46(1): 95-100. Brisbane. ISSN 0079-8835.

A new genus, *Cuemus*, is described from mountain rainforests in the northern Queensland Wet Tropics and placed in the tribe Coelometopini (Coleoptera: Tenebrionidae: Coelometopinae). Two allopatric new species, *C. monteithi* and *C. cooki*, are described, illustrated and keyed. *Cuemus* belongs to a monophyletic group that includes *Asopidiopsis* Kaszab and *Micromenandris* Kaszab, both endemic to Fiji. □ Coleoptera, Tenebrionidae, Coelometopinae, *Cuemus*, Australia, rainforest.

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Until about 25 years ago, the higher classification of the large beetle family Tenebrionidae (>15,000 species; Watt, 1982) had remained practically unchanged since Lacordaire's initial treatment of the world fauna (Lacordaire, 1859). Examination of larvae and internal organ systems has recently yielded a number of phylogenetically useful characters which have helped to redefine relationships within the family (Watt, 1974; Doyen & Lawrence, 1979; Tschinkel & Doyen, 1980; Doyen & Tschinkel, 1982). Based on this new evidence, the subfamily Coelometopinae, which includes the tribes Coelometopini, Strongyliini and Talanini (see Doyen, 1989), is thought to be the best supported clade within the family (Doyen & Tschinkel, 1982).

The diverse tribe Coelometopini is characterised by the presence of stellate sensoria on the last five to six antennal segments, reniform compound eyes separated by more than the width of one eye, paraproct baculi transverse (or rarely oblique as in *Zophophilus* Fairmaire), spermatheca derived from the apex of the accessory gland, as well as elongate defensive reservoirs usually with annular folds (Doyen, 1989). Coelometopini are especially species-rich in forested habitats in the tropical and subtropical regions of the world and the tribe contains a large number of flightless species as well as fully winged forms (Doyen, 1989). The adults are known to browse on fungal and algal growths on the outer surface of dead and live trees at night (Monteith, 1995) and the larvae can be found both in, and under the bark of, dead and decaying wood (Marshall, 1982).

Approximately 100 described species in the tribe Coelometopini are known to occur in Australia. As for most of the Australian tenebrionids,

the majority of these species were described during the late 1800's and early this century and only isolated and sporadic papers on this fauna have appeared since the 1930's (Doyen et al., 1990). Although adults are often scarce in collections (Doyen, 1995), the intensive sampling of northern Queensland's rainforest invertebrates by Queensland Museum staff, over the past decades, has yielded a large number of Coelometopini specimens (see Monteith, 1995). Approximately 50 undescribed species of Coelometopini are known to occur in these diverse rainforests. This paper describes a new genus (*Cuemus* gen. nov.) and two new species (*C. monteithi* sp. nov. and *C. cooki* sp. nov.) of Australian Coelometopini, discovered during this survey, and which are apparently restricted to high altitude rainforests in northern Queensland. Members of the genus are compact, convex beetles which superficially resemble species of the common Australian tenebrionid genus *Amarygmus* Dalman (Tenebrioninae: Amarygmmini).

MATERIALS AND METHODS

All specimens of *Cuemus* were collected by QM staff and the author and are lodged in the following collections: QM, Queensland Museum, Brisbane (G. Monteith, C. Burwell); UQ, University of Queensland Insect Collection, Brisbane (G. Daniels); ANIC, Australian National Insect Collection, Canberra (J.F. Lawrence); SAM, South Australian Museum, Adelaide (E.G. Matthews). Measurements (in millimetres) were made using a graticule in a Zeiss Stemi SV6 stereomicroscope. The holotype measurement is given first with range of other specimens in parentheses. Illustrations were made using a

drawing tube mounted on the same microscope. Dissection techniques and terminology of the anatomy of the defensive glands, ovipositor and female genital tube follow Tschinkel & Doyen (1980). The dissected genitalia are stored in glycerine in a genitalia vial mounted on the specimen pin. Terminology of the skeletal anatomy follows Lawrence & Britton (1994) and Lawrence et al. (1999). Specimens with the labels 'QMT(5 digit number)', refer to the Queensland Museum's register database. Data in square brackets in the specimen lists are not present on the insect labels but included for added clarity.

Cuemus gen. nov.

TYPE SPECIES. *Cuemus monteithi* sp. nov.

ETYMOLOGY. Derived from an acronym of the Queensland Museum 'QMUS'.

DESCRIPTION. Body very convex in lateral view, nitid, small, widest near middle of elytra; colour ranging from light brown to reddish brown; legs and antennae long and thin.

Head. Perpendicular to ground surface at rest, hypognathous. Punctations on cranium rather deep, consisting of single punctures a little smaller than one ommatidium. Area between eyes flat, about 3 times width of one eye. Eyes small, reniform, incised anteriorly by frontal canthus. Frons rounded above antennal insertion. Frontoclypeal suture semicircular, deep. Clypeus transverse, slightly widened apicad, anterior border slightly convex in middle. Anterior corners of clypeus extending beyond frontoclypeal suture, bearing a number of longer, fine yellow setae. Clypeal membrane completely exposed, trapeziform (Fig. 2A). Apical border of labrum straight, whitish. Supraorbital crest absent. Area behind eyes constricting sharply, continuing ventrally to form an angular fold in postgenal region. Mentum convex, without median longitudinal ridge. Mandibles bifid. Marginal ridge of mandibles prominent. Apical segment of maxillary palp securiform. Apex of lacinia without digitus. Antennae long, cylindrical, slender, reaching middle of elytra (Figs 1C, 2B). Last 6 segments bearing stellate sensoria. All segments covered by fine yellow setae.

Prothorax. Globular, wider than long, widest near middle, with very narrow and shallow lateral margins; anterior and posterior margins incomplete; anterior border straight, posterior border slightly convex. Punctations numerous, single, smaller than one ommatidium. Prosternum

anterior to procoxae narrower than length of one procoxa. Prosternal process sharply convex in side view, slightly expanded laterally between procoxae (Fig. 2D) and near apex. Procoxae separated by less than width of one coxa.

Pterothorax. Elytra strongly convex, widest near middle. Humeri as wide as posterior border of pronotum. Scutellar stria short, composed of 1 to 5 punctations. Scutellum small, triangular. The nine elytral striae composed of a series of narrow, deep punctations. Striae parallel, converging together near the apex. Stria 8 ending opposite middle of visible sternite 4. Strial pairs 1/9, 2/7, 3/6, and 4/5 joining near apex. Intervals flat. Apex of elytra narrowly rounded (Fig. 1B,D). Epipleuron short, ending at posterior margin of visible sternite 3, with a longitudinal carina near base. Mesepisternum with a few deep, broad punctations. Mesoventrite short, with a depression between coxae. Metaventricle very short, covered with fine yellow hairs. Discrimen joining in middle of metaventricle with oblique folds, forming a Y-shaped groove.

Abdomen. Abdominal ventrites with shallow punctations and fine yellow setae on sternites 6 and 7. Anterior projection of ventrite 1 between metacoxae broadly rounded.

Genitalia. Ovipositor long, soft, of 'coelometopine type' (Tschinkel & Doyen, 1980) (e.g. see Matthews & Doyen, 1989: fig. 3). Gonostyli pointing laterad. Coxite lobe 1 longer than lobes 2-4 combined. Paraprocts membranous, with transverse sclerotised baculi. Additional sclerotised baculi between paraproct baculi and base of proctiger present, about as long as length of paraproct baculus (Fig. 2G). Spiculum ventrale long and narrow. Spermatheca non-glandular, spherical, large, derived from apex of long, tube-like accessory gland. Accessory gland derived apically from saecate vagina. Defensive glands long, reaching anterior edge of abdomen, lacking dark, sclerotised helical thickenings typical of most Coelometopini, rather of the 'cnodalonine type' (Tschinkel & Doyen, 1980). Aedeagus with tegmen ventral at rest, rotated 180°. Median lobe adnate to tegmen (Fig. 2E,F).

Legs. Slender, relatively long, covered with fine yellow hairs (including coxae). Pilosity denser at apex of tibiae. Apex of femora usually darker in colour than base. Tibial spurs small, narrow and pointed, dark brown in colour. Tarsi covered with fine yellow setae dorsally. Penultimate tarsal segment always shorter than others. Ventral surface of first three tarsal segments (fore and

midlegs) and first 2 segments of hind legs densely pilose (Fig. 2C). Apical and penultimate segments arcuately curved, less densely pilose ventrally. Empodium with several long parempodia.

DIAGNOSIS AND RELATIONSHIPS. Based on the features of the female genital tube (spherical spermatheca derived from the apex of the accessory gland), the ovipositor (basal coxite elongate, longer than coxites 2-4 together; transversal baculus of paraproct), as well as external anatomy (eyes reniform, separated by more than the width of a single eye; antennae with stellate sensoria on the apical 6 segments), there is no doubt that this genus belongs to the tenebrionid tribe Coelometopini (Tschinkel & Doyen, 1980; Doyen & Tschinkel, 1982; Doyen, 1989). The following characters are unique to *Cuemus* among Australian Coelometopini: very convex profile, long and thin antennae reaching the middle of the elytra, apical antennal segments not flattened, longer than wide. *Neotheca* Carter is the only other genus in Australia with the clypeal membrane completely exposed, but it does not have the anterior corners of the clypeus extending beyond the frontoclypeal suture (as found in *Cuemus*).

A preliminary phylogenetic analysis including representatives of about 50 Australo-Pacific genera (including the Australian region plus the Papuan and Pacific subregions of the Oriental region (sensu Gressitt, 1961)) within the tribe Coelometopini was carried out to look for potential relatives of *Cuemus*. Only two other flightless genera, *Micromenandris* Kaszab and *Asopidiopsis* Kaszab, both endemic to Fiji (Kaszab, 1955), possess the external and internal female features which characterise *Cuemus*. Externally, these genera also have a completely exposed clypeal membrane and the anterior corners of the clypeus extending beyond the frontoclypeal suture. The main feature uniting these three genera is that the extra baculi between the paraprocts and proctiger are about the same length as the paraproct baculi. Other genera in the region differ from *Cuemus*, *Micromenandris* and *Asopidiopsis* in having either no extra baculi at all or, if they are present, they appear either as a short, thin sclerotised membrane or as long baculi, distinctly longer than the paraproct baculi. According to the preliminary phylogenetic analysis, the group including *Cnemus* and the two related genera from Fiji form a monophyletic clade which is basal within the Coelometopini and sister to all other members of the tribe in this region.

The genus *Micromenandris* is very easily separated from the other two because it has 11 elytral striae as opposed to 9 in *Cuemus* and *Asopidiopsis*. The absence of lateral margins on the pronotum of the five described *Asopidiopsis* taxa (including two subspecies) will distinguish them at once from *Cuemus* species.

The genus *Microsphaerotus*, with two species from Vietnam (Masumoto, 1998), is similar to *Cuemus* and *Asopidiopsis* externally, however dissection of a female *M. ruficornis* Pic revealed important differences in the ovipositor and genital tube.

BIOLOGY. All known specimens of *Cuemus* are from rainforest vegetation and were collected either by hand at night on the surface of standing or fallen dead wood, or using a pyrethrum knockdown technique on tree trunks and logs (Baehr, 1995).

KEY TO SPECIES OF *CUEMUS*

1. Body dark brown, except for patch of lighter colour between striae 6 and 9 near elytral apex; hypomeron with shallow punctations; pronotum with rounded anterior corners and regular lateral borders; metepisternum with at most a few shallow punctations . . . *monteithi* sp. nov.
Head and pronotum reddish brown, elytra light brown, with darker brown areas laterally near base and apically between striae 1 and 6; hypomeron with several deep, circular punctations; pronotum with angular anterior corners and irregular lateral borders; metepisternum with deep circular punctations *cooki* sp. nov.

Cuemus monteithi sp. nov. (Figs 1A-B, 2A-G)

ETYMOLOGY. Named after the naturalist G. B. Monteith, insect curator at the Queensland Museum, who has contributed immensely to the knowledge of Australia's fauna and flora.

MATERIAL. HOLOTYPE: ♀, QMT16318, Bellenden Ker Range, N Qld, Cable Tower 3, 1054m, 17 Oct-5 Nov 1981, Earthwatch/Qld Museum [Expedition], Pyrethrum knockdown; ANIC, Coleoptera, Voucher No. 83-0978, (QM). **PARATYPES:** 1 ♀, Bellenden Ker Range, 1km S of Cable Tower 6, 1054m, 17 Oct.-Nov. 5 1981, 500m, Earthwatch/QLD Museum [Expedition], ANIC Coleoptera, Voucher No. 83-0977, (ANIC). 1 ♀, same as previous; QMT16319 (QM). 1 ♀, 17°23'S 145°46'E, Bartle Frere, W Base, 28 Nov. 1998, 750m, Monteith, Cook & Bouchard, night collection; QMT71048. (UQ). 1 ♀, 16°56'S 145°51'E, Mt Murray Prior summit, 7-8 Dec 1998. Monteith & Bouchard, QMT71049 (QM) (body disarticulated). 1 ♂, Bell Peak North, 10km E Gordonvale, 13 Oct. 1982, 850-1000m, Monteith, Yeates & Thompson. QMT16320 (QM).

DESCRIPTION. Head dark brown, apex of clypeus and basal part of labrum slightly lighter

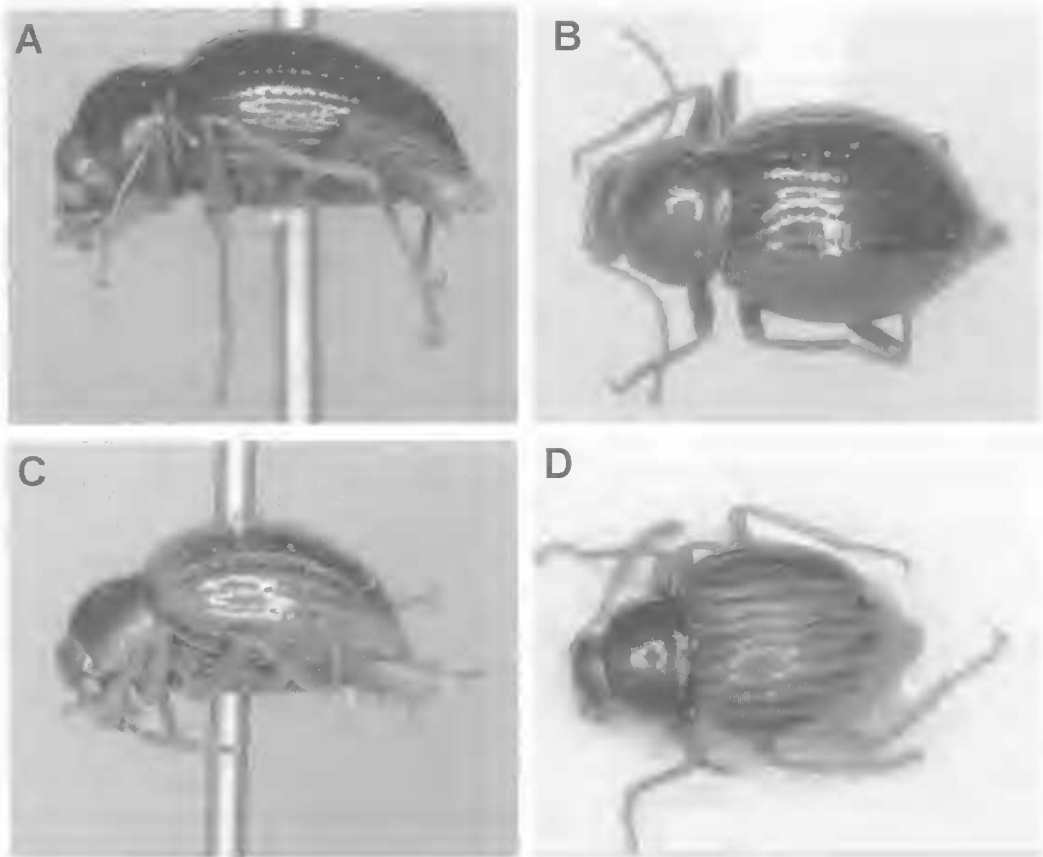


FIG. 1. A-B, *Cuemus monteithi* sp. nov., ♀; A, lateral view; B, dorsal view; C-D, *C. cooki* sp. nov., ♀; C, lateral view; D, dorsal view. (Photos: A. O'Toole).

in colour. Mouthparts and antennae light brown. Pronotum dark brown to reddish brown, with several circular punctations throughout. Hypomeron with shallow, circular punctations. Elytra dark brown, paler brown near apex between striae 6 and 9; strial punctations deep, usually with small darker circle around each one. Abdominal ventrites dark to reddish brown, with shallow punctations throughout; membrane between ventrites 3-4 and 4-5 light brown. Femora dark brown in colour, apices slightly darker. Tibiae dark brown, apices slightly lighter in colour, covered with fine yellow setae. Tarsi light brown. Tarsal claws reddish brown. Males identical to females externally.

MEASUREMENTS. Body length (from frons to apex of elytra), 5.35 (5.10-5.60); median pronotal length, 1.60 (1.44-1.55); maximum pronotal

width, 2.05 (1.86-2.20); elytral length, 3.60 (3.40-3.50); maximum elytral width, 3.15 (2.80-3.20).

DIAGNOSIS. Distinguished from *Cuemus cooki* by its darker, more uniform colour, shallow punctations on hypomeron, rounded anterior corners of pronotum, regular lateral borders of pronotum and metepisternum lacking the deep circular punctations of *C. cooki*.

DISTRIBUTION. This species has been collected only in high elevation rainforests in the Bellenden Ker and Malbon Thomson Range rainforest zones of the northern Queensland wet tropics (Monteith, 1995) (Fig. 3). The two ranges are closely adjacent but separated by the deep valley of the Mulgrave river.

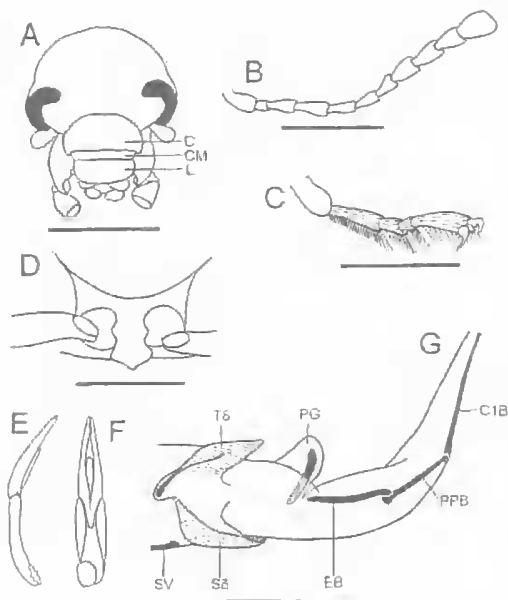


FIG. 2. *Cuemus monteithi* sp. nov.: A, head; B, left antenna; C, left hind tarsus; D, prosternum; E, aedeagus, lateral view; F, aedeagus, dorsal view; G, ovipositor. Scale bar, 1mm. Abbreviations: C, clypeus; C1B, coxite 1 baculus; CM, clypeal membrane; EB, extra baculus; L, labrum; PG, proctiger; PPB, paraproct baculus; S8, sternite 8; SV, spiculum ventrale; T8, tergite 8.

***Cuemus cooki* sp. nov.**
(Fig. 1C-D)

ETYMOLOGY. Named after Douglas Cook, also of the Queensland Museum, who assisted collection of the only specimens of this rare species.

MATERIAL. HOLOTYPE: ♀, QMT16316, Mt Finnigan, NE Qld, 760m, via Helenvale, July 20-27 1974. G. Monteith & D. Cook; rain forest, nocturnal, hand collected (QM). **PARATYPE:** ♀, same as holotype, QMT16317 (SAM).

DESCRIPTION. Head reddish brown, apex of clypeus and basal part of labrum slightly lighter in colour. Mouthparts and antennae light brown. Pronotum reddish brown, with several deep, circular punctations throughout. Hypomeron with several deep, circular punctations. Elytra light brown, with slightly darker areas laterally near base and apically between striae 1 and 6; striae punctations deep, with small darker circle around each one. Abdominal ventrites light brown, with shallow punctations throughout and distinct crenulations near anterior border of

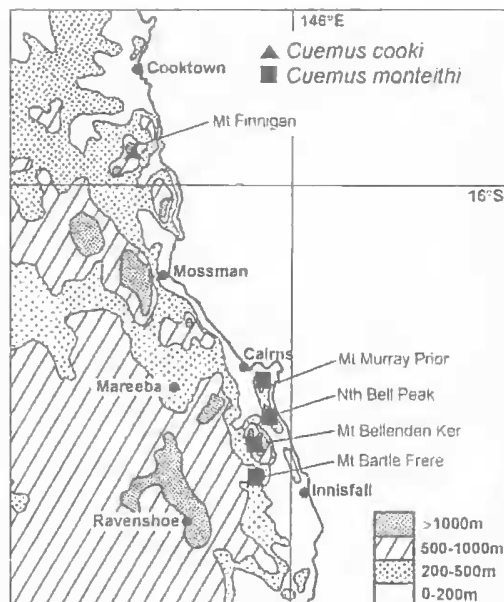


FIG. 3. Distribution of *C. monteithi* sp. nov. and *C. cooki* sp. nov. in northeast Queensland.

ventrites 1 to 3; membrane between ventrites 3-4 and 4-5 lighter in colour. Legs light brown, with areas slightly darker in colour near apex of femora. Tarsal claws reddish brown apically. Male not available.

DIAGNOSIS. Separated from *Cuemus monteithi* by its colour (reddish brown on head and pronotum, combined with a light brown colour for the rest of the body, except for two slightly darker areas on elytra), denser and deeper punctations on hypomeron, angular anterior corners of pronotum, lateral borders of pronotum with irregularly undulate and metepisternum with deep circular punctations.

MEASUREMENTS. Body length (from frons to apex of elytra), 4.60 (4.60); median pronotal length, 1.16 (1.10); maximum pronotal width, 1.84 (1.70); clytral length, 3.00 (2.90); maximum elytral width, 2.85 (2.65).

DISTRIBUTION. This species has only been collected once in rainforests on the summit of Mount Finnigan (Fig. 3).

ACKNOWLEDGEMENTS

Thanks to the curators listed for loans of specimens and to my supervisors, D.K. Yeates and G.B. Monteith for their support and helpful

comments. J. Skevington, S. Winterton and K. Evans provided helpful comments on the manuscript. A. O'Toole provided the photographs for Figure 1. Many thanks to K. Masumoto (Institute of Living Sciences, Otsuma Women's University, Japan), O. Merkl (Dept. Zoology, Hungarian Natural History Museum, Hungary) as well as E.G. Matthews (South Australian Museum, Australia) for suggesting potential related genera of *Cuemus*. Funding was provided by FCAR (Fonds pour la formation de Chercheurs et l'Aide à la Recherche, Canada), OPRS (Overseas Postgraduate Scholarship, Australia) and UQPRS (University of Queensland Postgraduate Scholarship, Australia).

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